

JUNIOR SCIENCE TALENT SEARCH EXAMINATION (JSTSE)
04 – A / 2017– 18 (For Class – IX)
Held on January 28, 2018

ANSWER KEYS

GENERAL KNOWLEDGE

1.	1	2.	2	3.	2	4.	2
5.	2	6.	3	7.	2	8.	3
9.	3	10.	4	11.	2	12.	2
13.	1	14.	1	15.	2	16.	4
17.	1	18.	1	19.	1	20.	3
21.	4	22.	2	23.	2	24.	3
25.	4	26.	2	27.	3	28.	1
29.	2	30.	3	31.	3	32.	4
33.	2	34.	3	35.	3	36.	4
37.	3	38.	4	39.	4	40.	1
41.	2	42.	1	43.	3	44.	3
45.	4	46.	3	47.	3	48.	1
49.	4	50.	1				

PHYSICS

51.	4	52.	4	53.	2	54.	4
55.	2	56.	1 & 2	57.	2	58.	3
59.	2	60.	1	61.	2	62.	1
63.	3	64.	1	65.	1	66.	4
67.	1	68.	4	69.	1	70.	3
71.	3	72.	3	73.	2	74.	1
75.	3	76.	1	77.	1	78.	1
79.	4	80.	1	81.	3	82.	4
83.	1	84.	1	85.	1	86.	4
87.	2	88.	2	89.	3	90.	1

CHEMISTRY

91.	3	92.	2	93.	1	94.	4
95.	1	96.	4	97.	4	98.	1
99.	3	100.	4	101.	1	102.	1
103.	4	104.	3	105.	3	106.	4
107.	1	108.	2	109.	4	110.	2
111.	4	112.	1	113.	1	114.	4
115.	1	116.	4	117.	1	118.	2
119.	1	120.	3	121.	4	122.	1
123.	2	124.	1	125.	3	126.	3
127.	2	128.	3	129.	3	130.	2

BIOLOGY

131.	3	132.	2	133.	3	134.	1
135.	4	136.	3	137.	1	138.	2
139.	2	140.	4	141.	3	142.	1
143.	1	144.	4	145.	2	146.	1
147.	3	148.	2	149.	4	150.	2
151.	1	152.	4	153.	1	154.	4
155.	3	156.	3	157.	4	158.	2
159.	1	160.	2	161.	4	162.	3
163.	1	164.	4	165.	3	166.	4
167.	2	168.	1	169.	3	170.	2

MATHEMATICS

171.	1	172.	4	173.	2	174.	3
175.	2	176.	3	177.	1	178.	4
179.	1	180.	2	181.	2	182.	4
183.	3	184.	2	185.	1	186.	3
187.	4	188.	4	189.	3	190.	3
191.	1	192.	4	193.	2	194.	3
195.	2	196.	4	197.	3	198.	2
199.	Not in option (1 : 16)			200.	3		

HINTS AND SOLUTIONS

51. 4
Sol. Slope is constant till t_0 hence moves at constant velocity till t_0 and then stops.
52. 4
Sol. Displacement is zero hence average velocity is zero.
53. 2
Sol. Velocity is speed and direction both. Due to change in direction velocity may change without changing speed.
54. 4
Sol. Stone is freely falling hence 'g' downward.
55. 2
Sol. Internal forces changes kinetic energy as well as potential energy but linear momentum depends on external forces.
56. 1 & 2
Sol. (1) According to **More to know** on the Page No. 153 or NCERT 9th class.
(2) Potential energy of attractive forces are always taken as negative.
57. 2
Sol.
$$40 = \frac{1}{2}g \left\{ \left(\sqrt{\frac{2h}{g}} \right)^2 - \left(\sqrt{\frac{2h}{g}} - 2 \right)^2 \right\}$$

 $\Rightarrow h = 45 \text{ m.}$
58. 3
Sol. $T^2 \propto r^3$
59. 2
Sol. Density depends on mass and volume.
60. 1
Sol. For spring $K \times \ell = \text{constant.}$
61. 2
Sol. Area under a – t graph gives change in velocity.
$$V = \frac{1}{2} \times 10 \times 10 = 50 \text{ m/s.}$$
62. 1
Sol. On heating diameter of disc increases and hence diameter of hole increases.
63. 3
Sol. When body floats
 $B = mg$
 $\Rightarrow vdg = VDg$
 $\Rightarrow \frac{v}{V} = \frac{D}{d}$
64. 1
Sol. $m_1 : m_2 = 1 : 8$
From conservation of momentum $V_1 : V_2 = 8 : 1.$

65. 1
Sol. Static friction is a self adjusting force upto its limiting value.

66. 4
Sol. Inside a cell, current is developed due to both +ve and -ve charges.

67. 1
Sol. Units of momentum and impulse are same.

68. 4
Sol. At the highest point horizontal component of velocity = $v \cos 60^\circ = \frac{v}{2}$.

$$\therefore \text{K.E. at top} = \frac{1}{2} m \left(\frac{v}{2} \right)^2 = \frac{1}{4} K$$

69. 1
Sol. Power = $F \times v$
 $= 1000 \times 10 = 10000 \text{ W}$
 $= 10 \text{ kW}$

70. 3
Sol. $V_1 = \text{Volume submerged}$
 $V_1 = \frac{m}{\rho_w}$ {m = mass of ice}
 $V_2 = \text{Volume of water formed.}$
 $V_2 = \frac{m}{\rho_w}$
 \Rightarrow Since, $V_1 = V_2$, hence level remains same.

71. 3
Sol. $g_h = g \left(\frac{R}{R+h} \right)^2 = g \left(\frac{R}{2R} \right)^2 = g \times \frac{1}{4} = \frac{g}{4}$
 \therefore Weight at height R above the earth surface = $\frac{m \times g}{4} = \frac{w}{4}$

72. 3
Sol. Average force = $\frac{\text{Change in momentum}}{\text{Time}}$
 $= \frac{5 \times 4}{2.5} = 8 \text{ dyne}$

73. 2
Sol. The recoil force = Change in momentum per second = mnv .

74. 1
Sol. Apparent weight of man = $mg_{\text{effective}}$
 $= m(g + a)$
 $= mg \left(1 + \frac{a}{g} \right)$
 $= w \left(1 + \frac{a}{g} \right)$

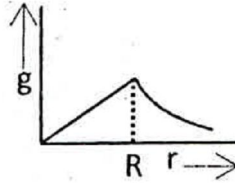
75. 3

Sol. Average velocity = $\frac{\text{Total displacement}}{\text{Total time}}$
$$= \frac{x}{\frac{x}{2v} + \frac{2x}{2v}} = \frac{2}{3}v$$

76. 1

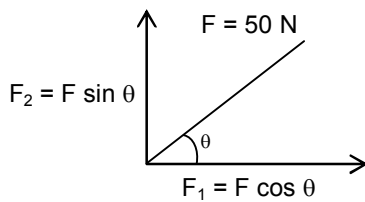
Sol. Inside earth $g \propto r$

& outside earth $g \propto \frac{1}{r^2}$



77. 1

Sol.



78. 1

Sol.
$$\frac{k_1}{k_2} = \frac{\frac{p^2}{2m}}{\left(p + \frac{10p}{100}\right)^2 \frac{2m}{121p^2}} = \frac{p^2 \times 100}{121p^2} = \frac{100}{121}$$

$$\therefore k_2 = \frac{121k_1}{100} = k_1 + \frac{21k_1}{100}$$

79. 4

Sol. Work done = Area under F – X graph = Change in kinetic energy = $\frac{1}{2}m(v^2 - u^2)$

$$\therefore \frac{1}{2}mv^2 = \frac{1}{2}(12 + 4) \times 10$$

$$\Rightarrow 0.1 v^2 = 160$$

$$v = \sqrt{1600} = 40 \text{ m/s.}$$

80. 1

Sol. Velocity of sound in air is independent of change in pressure.

81. 3

Sol. As acceleration is increasing initially, so velocity is initially increasing non-uniformly.

82. 4

Sol.
$$t = \sqrt{\frac{2 \times 12}{g}} - \sqrt{\frac{2 \times 10}{g}}$$

$$= \sqrt{2.4} - \sqrt{2} = 0.13 \text{ sec.}$$

83. 1

Sol. $a = \frac{v}{n}$

$$\begin{aligned} x \text{ (displacement in last two second)} &= \frac{1}{2}an^2 - \frac{1}{2}a(n-2)^2 \\ &= \frac{2v}{n}(n-1) \end{aligned}$$

84. 1

Sol. $KE = \frac{1}{2}mv^2 = \frac{1}{2}m\{2g(x-h)\}$
 $\Rightarrow KE \propto (-h)$

85. 1

Sol. Particles which are in same state of vibration are called in same phase.

86. 4

Sol. From conservation of momentum
 $mv_0 = 2mv_1$

$$\Rightarrow v_1 = \frac{v_0}{2}$$

From conservation of energy

$$\frac{1}{2} \times 2m v_1^2 = 2mgh$$

$$h = \frac{v_1^2}{2g} = \frac{v_0^2}{4} \times \frac{1}{2g} = \frac{v_0^2}{8g}$$

87. 2

Sol. On loading a tuning fork, its frequency decreases.

88. 2

Sol. $a = \frac{F}{m} = \frac{5 \times 10^4}{3 \times 10^7} = \frac{5}{3} \times 10^{-3} \text{ m/s}^2$

Now using, $v^2 = u^2 + 2ax$

$$= 0 + 2 \times \frac{5}{3} \times 10^{-3} \times 3 = 10^{-2}$$

$$\therefore V = \sqrt{10^{-2}} = 0.1 \text{ m/s}$$

89. 3

Sol. As coin falls behind the man.
 So, train is accelerating forward.

90. 1

Sol. For accelerated motion, distance-time graph is a parabola.

91. 3

Sol. Immiscible liquids are separated by separating funnel.

92. 2

Sol. Chlorine is added to disinfectant water during purification.

93. 1

Sol. Helium is filled in weather balloon.

94. 4
Sol. Formula of Sodium Zincate is Na_2ZnO_2 .
95. 1
Sol. Amalgam is a mixture of metal & mercury.
96. 4
Sol. Bromine and mercury exist in the liquid state.
97. 4
Sol. $\text{Vol}\% = \frac{\text{Vol. of solute}}{\text{Vol. of solution}} \times 100$
98. 1
Sol. $\begin{array}{ccc} \text{Cu} & & \text{O} \\ & \swarrow \quad \searrow & \\ & 1 & 2 \end{array} \longrightarrow \text{Cu}_2\text{O}$
99. 3
Sol. $\begin{array}{ccc} \text{Na} & & \text{N}^{3-} \\ & \swarrow \quad \searrow & \\ & 1 & 3 \end{array} \longrightarrow \text{Na}_3\text{N}$
100. 4
Sol. Iodine -131 is used to determine the activity of thyroid gland.
101. 1
Sol. Radon is an inert gas.
102. 1
Sol. Temporary hardness in water is due to presence of Hydrogen Carbonate of Ca & Mg.
103. 4
Sol. Tin – (Stannum) \rightarrow Sn
104. 3
Sol. Zinc corrodes rapidly
(Because Al forms a protective layer of aluminium oxide, so further corrosion stops)
105. 3
Sol. Carbon does not exhibit electrovalence.
106. 4
Sol. $d = \frac{m}{V} = \text{kg} / \text{m}^3$
107. 1
Sol. Solder is an alloy of Pb and Sn.
108. 2
Sol. MnO_4^- (permanganate)
109. 4
Sol. Double displacement reaction \rightarrow exchange of ions.
110. 2

- Sol. The Chemical used for starch test is Iodine Solution.
111. 4
Sol. The valence of an element depends upon the total number of electrons present in outermost shell of an atom.
112. 1
Sol. Lead has high density.
113. 1
Sol. Toothpaste is an example of colloid.
114. 4
Sol. Acid present in 'Tamarind' is tartaric acid.
115. 1
Sol. Freezing mixture is ice plus common salt.
116. 4
Sol. X-rays originates when cathode rays strikes on hard metal surface.
117. 1
Sol. During roasting of zinc blende. It converts to ZnO.
118. 2
Sol. I 131 is preferentially used to detect cancerous tumour. (Although As – 74 is used to locate brain "Tumors")
119. 1
Sol. Rubber stamp is made by thermosetting plastic.
120. 3
Sol. Because Ag is less reactive than Cu.
121. 4
Sol. Methanol is added in ethanol to make it unfit for drinking.
122. 1
Sol. Deficiency of vitamin E causes infertility.
123. 2
Sol. Nylon fibre has amide linkage.
124. 1
Sol. SO₂ is added to preserve squashes.
125. 3
Sol. Vitamin – B₁₂ is the only vitamin with metal atom.
126. 3
Sol. Glyptal is used in paints.
127. 2
Sol. Glycerol is added to shaving cream to prevent rapid drying.
128. 3
Sol. Glass is a Pseudo solid.

129. 3
Sol. Homogeneous mixture containing two liquids can be separated by distillation.
130. 2
Sol. In $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, one H_2O molecules is bonded by "H" bond.
131. 3
Sol. The cork is impervious to water due to Suberin deposition in the cell wall of its cell.
132. 2
Sol. Anabaena is not a Eukaryote.
133. 3
Sol. Five kingdom classifications was proposed by R.H. Whittaker.
134. 1
Sol. Centre of hunger is hypothalamus which is the part of fore brain.
135. 4
Sol. Red Blood corpuscles are formed in Bone Marrow.
136. 3
Sol. Moss and Ferns are found in moist and shady places because they require water for fertilisation.
137. 1
Sol. The species of plants and animals found exclusively in a particular area are called endemic species.
138. 2
Sol. Cotton is a cellulosic fibre.
139. 2
Sol. Viruses are exception to cell theory.
140. 4
Sol. Cerebrum is the largest part of brain.
141. 3
Sol. The excretory units of Annelida are Nephridia.
142. 1
Sol. Open Vascular system is found in Prawn.
143. 1
Sol. "Agar-Agar" is obtained from the cell walls of some species of Red Algae.
144. 4
Sol. Yeast is different from Bacteria in being Eukaryote.
145. 2
Sol. Wings of Bird and Wings of insect are an example of Analogous organs.
146. 1
Sol. "Systema-naturae" was written by Linnaeus.
147. 3
Sol. "Sleeping Sickness" is caused by Trypanosoma and transmitted through Tse-Tse fly.

148. 2
Sol. Capsid (Outer covering) of virus is made up of protein.
149. 4
Sol. DDT is non-biodegradable substance.
150. 2
Sol. Right part of Human heart carries deoxygenated blood.
151. 1
Sol. Chlorophyll - a is most abundant pigment present in green plants.
152. 4
Sol. Aseel is indigenous breed of chickens.
153. 1
Sol. Haemoglobin is dissolved in plasma of blood in Earthworm.
154. 4
Sol. Gymnosperm has naked embryo and specialised tissue for conduction of water.
155. 3
Sol. Penicillin blocks the formation of cell wall in bacteria.
156. 3
Sol. Smooth Endoplasmic Reticulum is involved in detoxification of poison and drugs.
157. 4
Sol. Ca^{++} are involved in clotting of blood.
158. 2
Sol. Lichens act as SO_2 pollution indicator.
159. 1
Sol. Vitamin – C is water soluble vitamin generally excreted by human.
160. 2
Sol. When RBCs, placed in hypertonic solution they will shrink.
161. 4
Sol. *Musca domestica* is the scientific name of house fly.
162. 3
Sol. Heart does not have voluntary muscles.
163. 1
Sol. A river with high "Biochemical oxygen Demand" (BOD) value is highly polluted.
164. 4
Sol. Gymnosperm is a phanerogams.
165. 3
Sol. Star fish is not a true fish it is Echinoderm.
166. 4
Sol. Active transport required ATP energy in order to take place.

167. 2
Sol. Insectivorous plants grow in Nitrogen deficient soil.

168. 1
Sol. Ozone depletion is caused by CFCs.

169. 3
Sol. Intercalary meristem is located at base of leaf.

170. 2
Sol. Immune system is seriously affected by AIDS.

171. 1
Sol. $(a^2 + a)^2 + 4(a^2 + a) - 12$
Let $a^2 + a = x$
 $\Rightarrow x^2 + 4x - 12 = (x + 6)(x - 2)$
 $= (a^2 + a + 6)(a^2 + a - 2)$
 $= (a^2 + a + 6)(a + 2)(a - 1)$

172. 4
Sol. $a + b = 7$ and $a^3 + b^3 = 133$
using $(a + b)^3 = a^3 + b^3 + 3ab(a + b)$
 $\Rightarrow ab = 10$
Now using $(a + b)^2 = a^2 + b^2 + 2ab$
We get $a^2 + b^2 = 29$

173. 2
Sol. $0.5(4x + 1) = 0.3(2x + 1) + 1.6$
 $\Rightarrow 20x + 5 = 6x + 3 + 16 \Rightarrow x = 1$

174. 3
Sol. Total possible outcomes = 25
Favourable = $\{3, 5, 7, 11, 13, 17, 19, 23\} = 8$
Probability = $\frac{8}{25}$

175. 2
Sol. Let CP of 1 dozen = Rs. 12 \Rightarrow CP of 1 apple = Re. 1
SP of 100 = Rs. 96 \Rightarrow SP of 1 apple = Rs. $\frac{96}{100}$
Loss = Rs 0.04 \Rightarrow loss% = 4

176. 3
Sol. $\frac{a^4 - a^3b - ab^3 + b^4}{a^4 + a^3b - ab^3 - b^4} = \frac{a^3(a - b) - b^3(a - b)}{a^3(a + b) - b^3(a + b)}$
 $= \frac{(a^3 - b^3)(a - b)}{(a^3 - b^3)(a + b)} = \frac{a - b}{a + b}$

177. 1

Sol. Area of triangle = $\frac{1}{2} \times 63 \times 16 = \frac{1}{2} \times 65 \times XP$
 $\Rightarrow XP = 15.5$ units

178. 4

Sol. $\left[\frac{\sqrt{4^5} + (\sqrt{2})^{10}}{(\sqrt[3]{4})^9 - (\sqrt[3]{2})^9} \right] \times \sqrt{9}$
 $= \frac{2^5 + 2^5}{4^3 - 2^3} \times 3 = \frac{24}{7}$

179. 1

Sol. $9^{x-2} = 3^{x+1} \Rightarrow 2(x-2) = x+1$
 $\Rightarrow x = 5$
 So, $2^{1+x} = 64$

180. 2

Sol. Putting $x = -1$ and $x = 2$
 We get $a + b = 7$ and $2a - b = -1$
 On solving $a = 2, b = 5$

181. 2

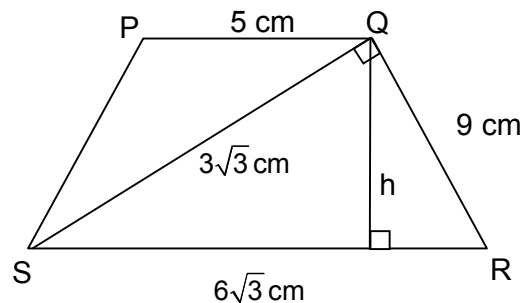
Sol. $\sqrt{\frac{(x^2 + 3x + 2)(x^2 + 5x + 6)}{x^2(x^2 + 4x + 3)}} = \sqrt{\frac{(x+1)(x+2)(x+2)(x+3)}{x^2(x+3)(x+1)}}$
 $= \frac{x+2}{x}$

182. 4

Sol. $\left(\frac{1}{1-x} + \frac{1}{1+x} \right) + \frac{2}{1+x^2} + \frac{4}{1+x^4} + \frac{8}{1+x^8}$
 $= \frac{2}{1-x^2} + \frac{2}{1+x^2} + \frac{4}{1+x^4} + \frac{8}{1+x^8}$
 $= \frac{4}{1-x^4} + \frac{4}{1+x^4} + \frac{8}{1+x^8}$
 $= \frac{8}{1-x^8} + \frac{8}{1+x^8} = \frac{16}{1-x^{16}}$

183. 3

Sol. $\frac{1}{2} \times QS \times 9 = \frac{81}{2\sqrt{3}}$
 $\Rightarrow QS = 3\sqrt{3}$ cm
 $\Rightarrow SR = 6\sqrt{3}$ cm
 Now $\frac{1}{2} \times 6\sqrt{3} \times h = \frac{81}{2\sqrt{3}} \Rightarrow h = \frac{9}{2}$ cm
 So, Area of trapezium
 $= \frac{1}{2} \times (5 + 6\sqrt{3}) \times \frac{9}{2}$



$$= (11.25 + 13.5\sqrt{3}) \text{ cm}^2$$

184. 2

Sol. $\angle CBE = 65^\circ$ and $\angle ABC = 90^\circ \Rightarrow \angle ABE = 25^\circ$
 $\angle DEC = \angle ACE = \angle ABE = 25^\circ$

185. 1

Sol. Let 25 paise coins = x

1 Re coins = 3x

50 paise coins = 220 - 4x

$$\text{Total amount} = \frac{x}{4} + 3x + \left(\frac{220 - 4x}{2}\right) = 160$$

$$x = 40$$

$$\Rightarrow 50 \text{ Paise coins} = 60$$

186. 3

Sol. $x + y + z = 2$

$$x^2 + y^2 + z^2 + 2(xy + yz + zx) = 4$$

$$x^2 + y^2 + z^2 + 2(-1) = 4$$

$$x^2 + y^2 + z^2 = 6$$

$$x^3 + y^3 + z^3 - 3xyz = (x + y + z)(x^2 + y^2 + z^2 - xy - yz + zx)$$

$$x^3 + y^3 + z^3 - 3(-2) = (2)(6 - (-1))$$

$$x^3 + y^3 + z^3 = 8$$

187. 4

Sol. $\frac{1}{x} = \frac{1}{7.5} + \frac{1}{4.5} = \frac{2}{15} + \frac{2}{9} = \frac{16}{45}$

$$\Rightarrow x = 2\frac{13}{16} \text{ cm}$$

$$\frac{x}{4.5} = \frac{y}{y+3}$$

$$\frac{45}{4.5 \times 16} = \frac{y}{y+3}$$

$$10y + 30 = 16y$$

$$y = 5 \text{ cm}$$

188. 4

Sol. $\frac{AC}{BC} = \frac{\sqrt{3}}{1}$

189. 3

Sol. Given: $a + b + 25 = 60 \Rightarrow a + b = 35$

$$a^2 + b^2 = 25^2$$

$$ab = \frac{1}{2}[(a+b)^2 - (a^2 + b^2)]$$

$$= \frac{1}{2}[1225 - 625]$$

$$= \frac{1}{2}[600]$$

$$= 300$$

\therefore area of $\Delta = 150 \text{ cm}^2$

190. 3

Sol. $a + b\sqrt{30} = \frac{(\sqrt{2.3} - \sqrt{0.69})^2}{2.3 - 0.69}$

$$= \frac{2.3 + 0.69 - 2\sqrt{2.3 \times 0.69}}{1.61}$$

$$= \frac{2.99 - 2(0.23)\sqrt{30}}{1.61}$$

$$= \frac{2.99}{1.61} - 2\left(\frac{0.23}{1.61}\right)\sqrt{30}$$

$$= \frac{13}{7} - \frac{2}{7}\sqrt{30}$$

$\Rightarrow a = \frac{13}{7}, b = \frac{-2}{7}$

191. 1

Sol. $x = 3 - 2\sqrt{2}$

$$\frac{1}{x} = 3 + 2\sqrt{2}$$

$$x^2 + \frac{1}{x^2} = \left(x + \frac{1}{x}\right)^2 - 2$$

$$= 36 - 2$$

$$= 34$$

192. 4

Sol. Area of shaded region
 $=$ Area of ABCD $-$ (area of Δ NDM $+$ area of Δ CBL $+$ area of Δ NAL)
 $= 256 - (24 + 80 + 24)$
 $= 256 - 128$
 $= 128 \text{ cm}^2$

193. 2

Sol. $x = 3 + 3^{2/3} + 3^{1/3}$
 $x - 3 = 3^{2/3} + 3^{1/3}$
 Cubing both sides,
 $x^3 - 27 - 9x(x - 3) = 3^2 + 3 + 3 \cdot 3^{2/3} \cdot 3^{1/3} (x - 3)$
 $x^3 - 27 - 9x^2 + 27x = 9 + 3 + 9x - 27$
 $x^3 - 9x^2 + 18x - 12 = 0$

194. 3

Sol. $x^a = y^b = z^c$

$$z = y^{\frac{b}{c}} \text{ and } x = y^{\frac{b}{a}}$$

Now, $y^2 = zx$

$$\Rightarrow y^2 = y^{\frac{b}{c} + \frac{b}{a}}$$

$$\Rightarrow y^2 = y^{b\left(\frac{1}{a} + \frac{1}{c}\right)}$$

$$\Rightarrow 2 = b\left(\frac{1}{a} + \frac{1}{c}\right)$$

$$\Rightarrow \frac{1}{a} + \frac{1}{c} = \frac{2}{b}$$

195. 2

Sol. $x = 150^\circ$ (\because opposite angles of cyclic quadrilateral are supplementary)

$y = 30^\circ$ (\because angles in the same segment are equal)

$z = 60^\circ$ (\because angle subtended by an arc at the centre is double of the angle subtended at the circumference)

$$\therefore 2x + y + z = 390^\circ$$

196. 4

$$\text{Sol. } \frac{b-0}{0-a} = \frac{1-b}{1-0}$$

$$\frac{b}{-a} = \frac{1-b}{1}$$

$$b = -a + ab$$

$$a + b = ab$$

$$\frac{1}{a} + \frac{1}{b} = 1$$

197. 3

Sol. The intercepts (or vertices of the rhombus) are at $\left(\frac{c}{a}, 0\right), \left(0, \frac{c}{b}\right), \left(-\frac{c}{a}, 0\right)$ and $\left(0, -\frac{c}{b}\right)$

$$\therefore \text{Area} = \frac{1}{2} \times \frac{2c}{a} \times \frac{2c}{b}$$

$$= \frac{2c^2}{ab}$$

198. 2

$$\text{Sol. } 2^{a+3} = 4^{a+2} - 48$$

$$\Rightarrow 8 \times 2^a = 16 \times 2^{2a} - 48$$

$$\Rightarrow 2^a = 2 \times 2^{2a} - 6$$

$$\Rightarrow 2 \times 2^{2a} - 2^a - 6 = 0$$

$$\Rightarrow (2 \times 2^a + 3)(2^a - 2) = 0$$

$$\Rightarrow 2^a = \frac{-3}{2} \text{ or } 2$$

$$\Rightarrow a = 1$$

199. Not in option (1 : 16)

Sol. Let the radii be r_1 and r_2 respectively.

$$\text{Given : } r_1 + r_2 = 15$$

$$\text{Also, } \pi(r_1^2 + r_2^2) = 153\pi \quad \Rightarrow r_1^2 + r_2^2 = 153$$

Solving we get, $r_1 = 3$ and $r_2 = 12$

$$\therefore \text{ratio of areas} = \left(\frac{3}{12}\right)^2 = 1:16$$

200. 3

Sol. $(x+3)(x-5)(x+7)$
 $= x^3 - (-3-7+5)x^2 + (-15-35+21)x - (105)$
 $= x^3 + 5x^2 - 29x - 105$
 \therefore Sum of coefficient of x^2 and $x = 5 - 29 = -24$